



Spotting Errors in a Calculation

Study Development Worksheet

Example

A patient must be given 250ml of fluid over 8 hours. What volume of fluid will they receive from an infusion each hour? What volume of fluid will they receive from an infusion each minute?

$$\text{Volume of fluid given per hour (ml/hour)} = \frac{\text{Volume of fluid (ml)}}{\text{Time (hours)}} = \frac{250}{8} = 31$$

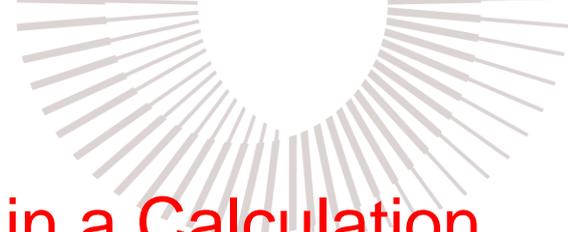
$$\text{Volume of fluid given per minute (ml/minute)} = \frac{\text{Volume of fluid (ml)} \times 60}{\text{Time (hours)}} = \frac{250 \times 60}{8} = \frac{1500}{8} =$$

187.5

Are there any mistakes in this answer? How would you correct them?

Answer

- The volume of fluid given per hour has been rounded. It should be written as 31.25, as the question has not asked for the answer to be rounded.
- The formula volume of fluid given per minute has been copied incorrectly. It should be 'volume of fluid given per minute (ml/minute) = $\frac{\text{Volume of fluid (ml)}}{\text{Time (hours)} \times 60 \text{ (minutes/hour)}}$ '.
- 250 x 60 has been calculated incorrectly. This should be equal to 15,000. However, since the incorrect formula was used, we do not need to repeat this calculation to get the correct answer.
- Neither answer has been written with the correct units.
- The two answers should therefore be: volume of fluid given per hour = 31.25 ml/hour, volume of fluid given per minute = 0.521 ml/minute.



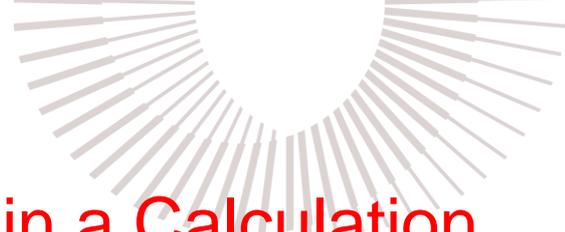
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Questions

Identify any mistakes in the following answers, and correct them to get the right answer.

1. A patient is prescribed a drug that has a dosage of 2mg/kg of bodyweight per day. The patient weighs 40kg. How much of the drug should the patient take in the day?
 - Daily dose = patient's bodyweight x dosage per day = $2 \times 40 = 80$ per day
The dosage is 2mg/kg of bodyweight per day so the patient should take the drug twice per day. Therefore, one dose is 40.
2. A patient is prescribed 20mg of a drug to be given intravenously. The vials of the drug contain 4000micrograms/2ml. How many ml should be given to the patient?
 - Tablet dose = $\frac{\text{dose prescribed}}{\text{dose in stock}} = \frac{20 \text{ mg}}{4000 \text{ mg}/2\text{ml}} = 0.005 \text{ mg}$
3. A child requires a painkiller. They weigh 6st4, and the drug has a dosage of 4ml/kg of bodyweight per day, to be taken 3 times per day. How much should the child take in a single dose of the painkiller?
 - 6st4 = 64lbs. $64 \text{ lbs} \times 0.454 = 29.056\text{kg}$ of bodyweight.
Daily dose = bodyweight (kg) x dosage = $29.056 \text{ kg} \times 4 \text{ ml/kg/day} = 116 \text{ ml/day}$
Single dose = $\frac{166 \text{ ml/day}}{3 \text{ doses/day}} = 55.33 \text{ ml/dose}$.



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Answer

1. There are two mistakes in this answer. The person answering has incorrectly assumed that the drug must be taken twice per day because of the dosage. The dosage does not affect the number of doses in the time period. The other mistake is that units have not been used.

The answer should be:

$$\begin{aligned}\text{Daily dose (mg/day)} &= \text{patient's bodyweight (kg)} \times \text{dosage per day (mg/kg/day)} \\ &= 40\text{kg} \times 2\text{mg/kg/day} = 80 \text{ mg/day}.\end{aligned}$$

2. There are two mistakes in this answer. The measurement of the dose in stock is given in micrograms/2ml and the dose prescribed is given in mg. In order to fix this, we must convert the dose in stock into mg/2ml. We do this by dividing by 1000, to get the dose in stock to be 4mg/2ml. Secondly, the wrong formula has been chosen. This drug must be given intravenously, so we calculate this as follows:

$$\text{Suspension dose (ml)} = \frac{\text{dose prescribed (mg)}}{\text{dose in stock (mg)}} \times \text{stock volume (ml)} = \frac{20 \text{ mg}}{4 \text{ mg}} \times 2 \text{ ml} = 10\text{ml}.$$

3. The child's weight has not been converted correctly. The stones have been multiplied by 10 instead of 14. This step should be:

$$6\text{st}4 = (6 \times 14) \text{ lbs} + 4\text{lbs} = 88\text{lbs}. 88\text{lbs} \times 0.454 = 39.952 \text{ kg}.$$

The daily dose has been rounded, when it should not have been yet. It has also been transferred incorrectly when it has been put into the single dose equation. The answer should be:

$$\text{Daily dose (ml/day)} = 39.952 \text{ kg} \times 4 \text{ ml/kg/day} = 159.808 \text{ ml/day}$$

$$\text{Single dose (ml/dose)} = \frac{159.808 \text{ ml/day}}{3 \text{ doses/day}} = 53.26933 \text{ ml/dose} = 53.27 \text{ ml/dose (rounded for}$$

ease).

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